

REMARKS

Claims 1-60 are pending. Claims 1-4, 8-10, 17-18, 20-23, 27 and 29 have been amended, and claims 30-60 have been added.

I. DRAWINGS OBJECTION

The drawings are objected to under 37 C.F.R. § 1.83(a) since the different cross-sectional widths set forth in claims 8, 9, 22 and 23 must be shown or the features canceled from the claims.

In the Submission Of Proposed Drawing Amendment For Approval By Examiner submitted herewith, Figure 6A has been added which shows the different cross-sectional areas of first pole piece 58 (first write pole) and second pole piece 60 (second write pole). The specification has been amended at page 11, line 1 and at page 20, line 5, to refer to Figure 6A. In addition, claims 8, 9, 22 and 23 have been amended to recite terminology consistent with the specification's disclosure that the second write pole has a larger cross-sectional area than the first write pole. See page 19, line 24 to page 20, line 1.

Accordingly, Applicant respectfully requests that this objection should be withdrawn.

II. SPECIFICATION OBJECTION

The specification is objected to under 37 C.F.R. § 1.84(p)(5) because it does not include the following reference signs: Letter A as shown in Figures 1 and 2, numeral 206 as shown in Figure 9, and numerals 300, 302, 308, 310, 312 and 314 and letter C' as shown in Figure 10.

The specification has been amended to describe arrow A in Figure 1 by inserting "as the magnetic media 520 is rotated or moved in the direction of arrow A" at page 3, line 8.

The specification describes arrow A in Figure 2 at page 6, lines 13-14.

In the Submission Of Proposed Drawing Amendment For Approval By Examiner submitted herewith, numeral 206 has been deleted from Figure 9.

The specification describes numerals 300, 302, 308, 310, 312 and 314 and arrow C' in Figure 10 at page 24, line 24 to page 25, line 12.

Accordingly, Applicant respectfully requests that this objection should be withdrawn.

III. CLAIM OBJECTIONS

Claims 21-26 and 28 are objected to because in claim 21, line 6, "a" should be deleted. Claim 21 has been amended to delete "a" at line 6. Accordingly, Applicant respectfully requests that this objection should be withdrawn.

IV. SECTION 112, SECOND PARAGRAPH REJECTIONS

Claims 4, 10 and 29 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The Examiner sets forth several basis for rejection which are addressed in the individual paragraphs below.

In claim 4, line 3, the Examiner asserts that "Lorentzian-type" is vague and indefinite. Claim 4 has been amended to delete "Lorentzian-type," although other claims recite a "substantially Lorentzian pulse shape." Lorentzian pulse shapes are discussed throughout the specification. For instance, Figure 5 shows a Lorentzian pulse shape, and Figure 7 shows a Lorentzian-like pulse shape with higher amplitude values on either side of the peak than an ideal Lorentzian pulse shape. Furthermore, Lorentzian pulse shapes are well known by those skilled in the art. See, for instance, Magneto-Resistive Heads : Fundamental and Applications by John C. Mallinson, Academic Press, Inc., 1996, pages 64, 81, 83 and 87; and Magnetic Storage Handbook by C. Denis Mee and Eric D. Daniel, McGraw-Hill, 1996, pages 2.12-2.13. Copies of the cited pages are attached hereto as Exhibit A.

In claim 10, line 2, the Examiner asserts that “the first, second and third pole pieces” are unclear and confusing as to whether they are part of the write element and yoke in claim 1 or in addition to the write element and yoke. Accordingly, claim 10 has been amended to make clear that the yoke includes the first, second and third pole pieces.

In claim 29, line 2, the Examiner asserts that “virtual contact” is vague and indefinite. Accordingly, claim 29 has been amended to delete this phrase and recite that “said read element floats above said magnetic media on a cushion of air during a read operation.”

Based on the foregoing, Applicant submits that this rejection should be withdrawn.

V. SECTION 102 REJECTIONS

Claims 1-4, 6, 7, 10, 11, 13-15, 17-19, 21, 24-27 and 29 are rejected under 35 U.S.C. § 102(b) as being anticipated by *Tanaka et al.* (U.S. Patent No. 5,486,967).

Claim 1 has been amended to recite a head that includes “a magnetoresistive read element mounted in a flux flow path of said yoke, wherein said magnetoresistive read element produces a readback pulse having a substantially Lorentzian pulse shape in response to one of said perpendicular magnetic storage transitions” for use in a magnetic recording system with “circuitry adapted to receive a readback pulse with a substantially Lorentzian pulse shape from said head.”

Likewise, claim 17 has been amended to recite a magnetic recording system that includes “a magnetoresistive element mounted in said flux guide for producing a readback pulse having a substantially Lorentzian pulse shape in response to said magnetic flux; and circuitry adapted to receive a readback pulse having a substantially Lorentzian pulse shape from said magnetoresistive element.”

Tanaka et al. fails to teach or suggest a magnetoresistive element that produces a readback pulse having a substantially Lorentzian pulse shape, much less circuitry adapted to

receive such a readback pulse from the magnetoresistive element. For instance, Figures 8-10 each illustrate the waveform of a reproduction signal formed by the magnetic head shown Figure 5 (col. 9, lines 55-57). These waveforms do not even remotely resemble a substantially Lorentzian pulse shape. Thus, *Tanaka et al.* fails to teach, suggest, or even remotely hint at the inventions defined in claims 1 and 17.

A claim is anticipated only if the reference discloses each and every claim element. *Tanaka et al.* fails to teach or suggest key elements of independent claims 1 and 17. Therefore, Applicant respectfully requests that this rejection be withdrawn.

VI. SECTION 103 REJECTIONS

Claims 1-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hesterman et al.* (U.S. Patent No. 5,434,733) in view of *Hamilton* (U.S. Patent No. 4,423,450).

As mentioned above, claim 1 has been amended to recite a head that includes “a magnetoresistive read element mounted in a flux flow path of said yoke, wherein said magnetoresistive read element produces a readback pulse having a substantially Lorentzian pulse shape in response to one of said perpendicular magnetic storage transitions” for use in a magnetic recording system with “circuitry adapted to receive a readback pulse with a substantially Lorentzian pulse shape from said head.” Likewise, claim 17 has been amended to recite a magnetic recording system that includes “a magnetoresistive element mounted in said flux guide for producing a readback pulse having a substantially Lorentzian pulse shape in response to said magnetic flux; and circuitry adapted to receive a readback pulse having a substantially Lorentzian pulse shape from said magnetoresistive element.”

As the Examiner correctly notes, *Hesterman et al.* fails to teach or suggest the use of perpendicular media. Moreover, *Hesterman et al.* says nothing about a magnetoresistive element that produces a readback pulse having a substantially Lorentzian pulse shape. In fact, *Hesterman et al.* discloses in Figure 5 a graph plotting mean flux density in a magnetoresistive element

versus position of a single magnetic transition in the medium that is similar to the graph of readback pulse voltage versus head position for conventional MR heads in longitudinal recording systems shown in Figure 4 of the instant application. Neither *Hesterman et al.* nor *Hamilton*, alone or in combination, teach, suggest, or even remotely hint at a magnetoresistive element that produces readback pulses with substantially Lorentzian pulse shapes in response to perpendicular magnetic storage transitions in a storage media, much less a magnetic storage device with circuitry adapted for receiving such pulses from a magnetoresistive element.

As the specification makes clear, Applicant does not claim to have invented yoked MR heads or perpendicular recording media. However, Applicant has discovered that a flux-guided (yoked) MR head can provide a readback pulse signal with a substantially Lorentzian pulse shape in response to perpendicular magnetic storage transitions. This approach provides numerous advantages, including reducing or eliminating thermal asperities, electrostatic discharge and element material corrosion in the MR head, and avoiding the need for signal processing circuitry, such as a differentiator, that is otherwise used to convert step function waveforms into Lorentzian shaped pulses, which in turn requires additional hardware and increases signal noise.

Neither *Hesterman et al.* nor *Hamilton*, alone or in combination, teaches or suggests the inventions defined by independent claims 1 and 17. The Examiner has provided absolutely no explanation as to how or why one skilled in the art would recognize the claimed invention in view of the art of record. Therefore, Applicant respectfully requests that this rejection be withdrawn.

VII. OTHER AMENDMENTS

The specification and claims have been amended to improve clarity. No new matter has been added.

VIII. NEW CLAIMS

Claims 30-60 have been added to further describe various features of the invention. No new matter has been added.

IX. FEES

The fees for the additional claims is calculated as follows:

For	Claims Remaining After Amendment	Highest Number Previously Paid For		Extra Claims	Rate		Additional Fee
Total Claims	60	- 29	=	31	x \$18	=	\$558
Independent Claims	3	- 3	=	0	x \$78	=	\$0
Multiple Dep. Claim	0	0				=	0
Total Fee						=	\$558

Please charge the \$558 fee to Deposit Account No. 13-0016/276 and charge any underpayment or credit any overpayment to this Account.

X. CONCLUSION

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231,	
on <u>June 18</u> , 1999.	
<u>D. Sigmond</u>	<u>6/16/99</u>
David M. Sigmond Attorney for Applicant	Date of Signature

Respectfully submitted,

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